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(56) Documents Cited
GB 2038471 A EP 0867319 A US 5819841 A
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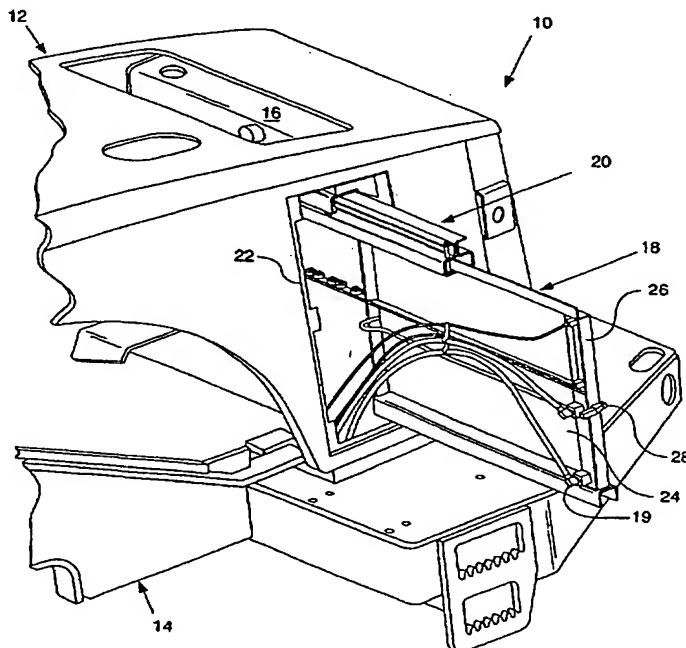
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(54) Abstract Title
Slidable heat-exchanger core elements for a mobile machine

(57) In a working vehicle having a heat exchange cooling core element assembly 18, e.g. for an oil cooler or an air conditioning condenser, the assembly is mounted in a slide mechanism 20 so that it can be pulled out to an extended position for cleaning. The core element assembly is normally within a hood 12 of the vehicle. The slide mechanism includes a clamp 28 which is released to allow the extension of the mechanism. The component parts of the slide mechanism are mounted on one another through rollers (Figs 3 and 4).

Fig. 1.



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Fig. 1

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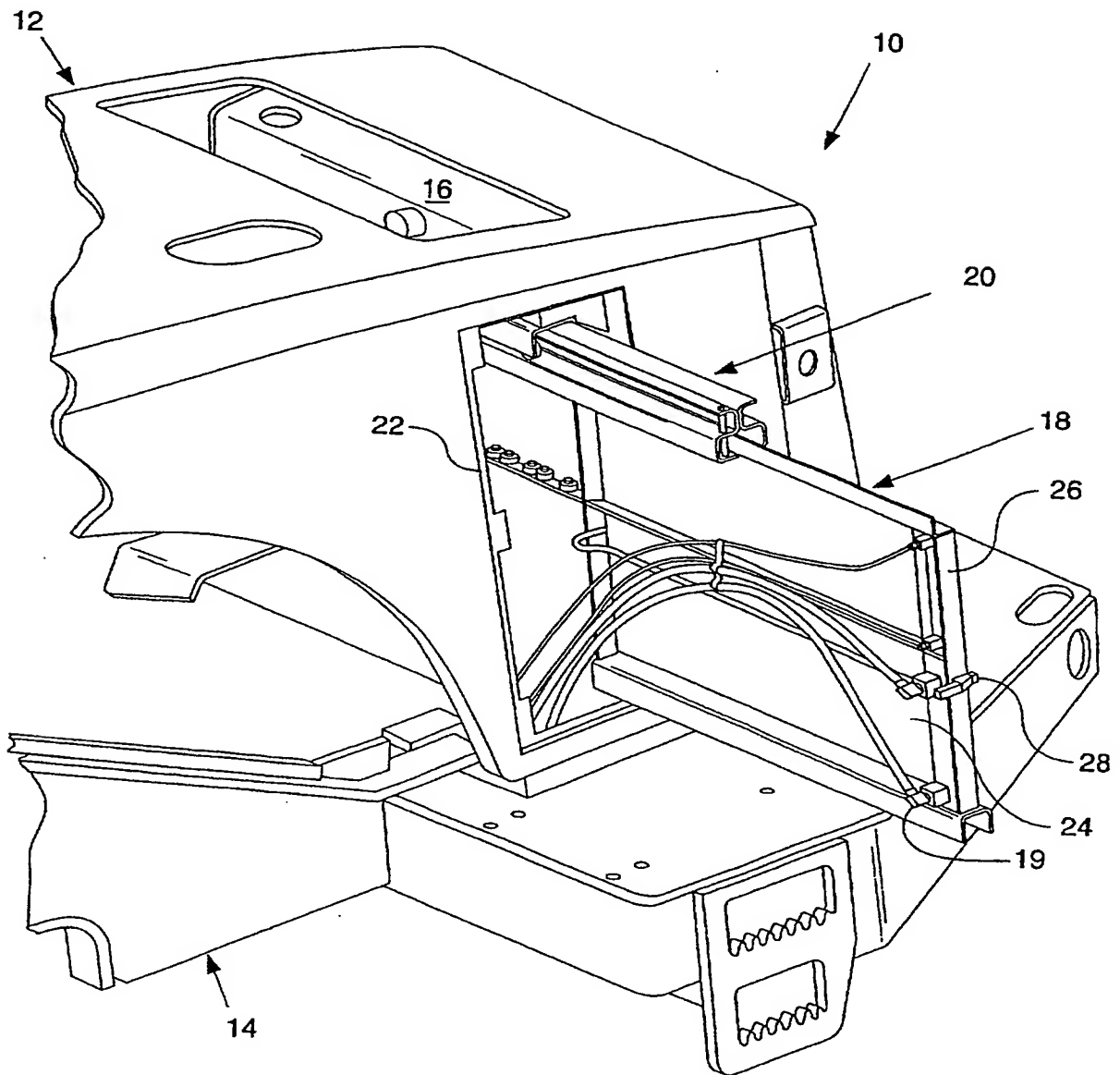


FIG. 2.

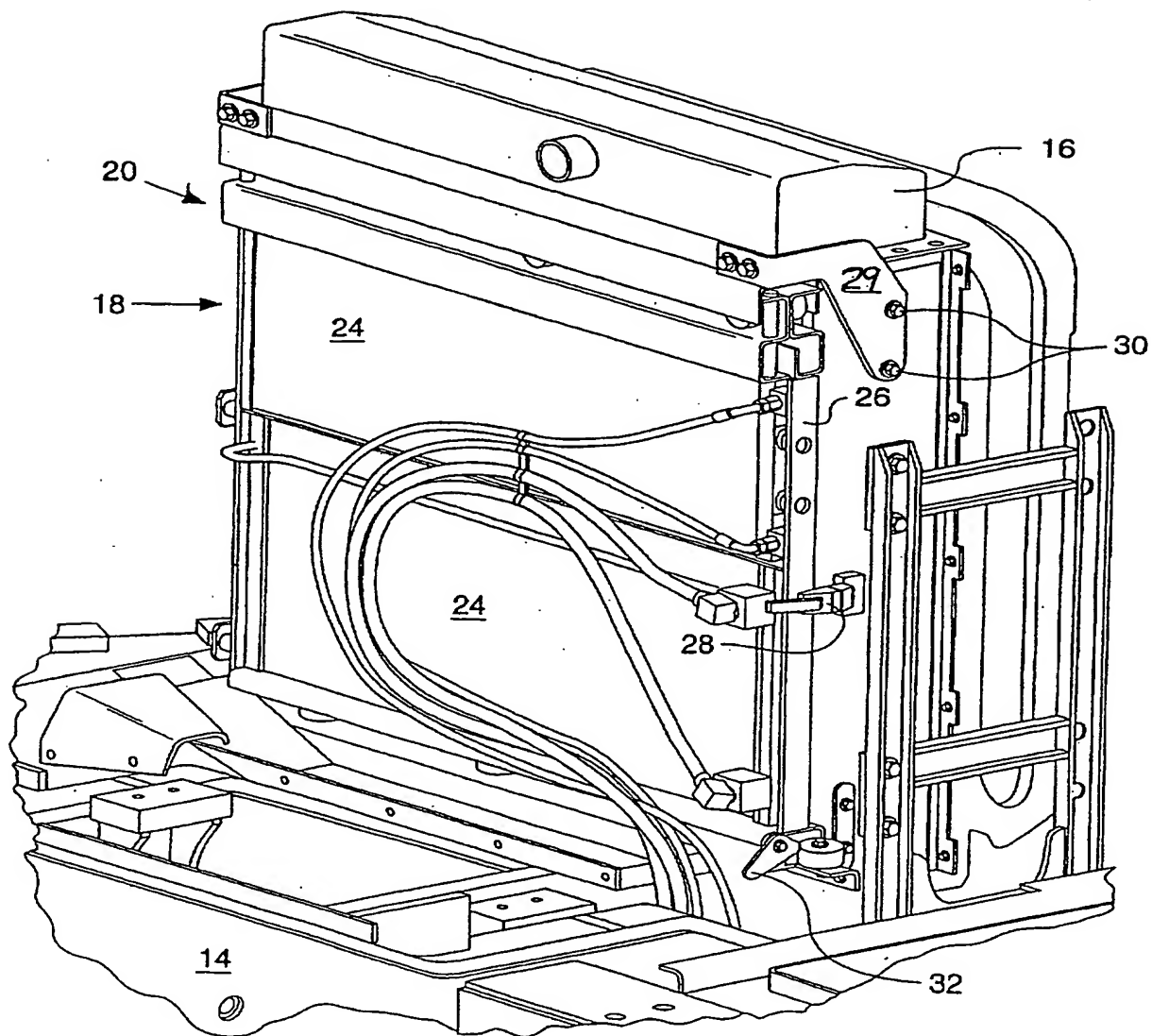
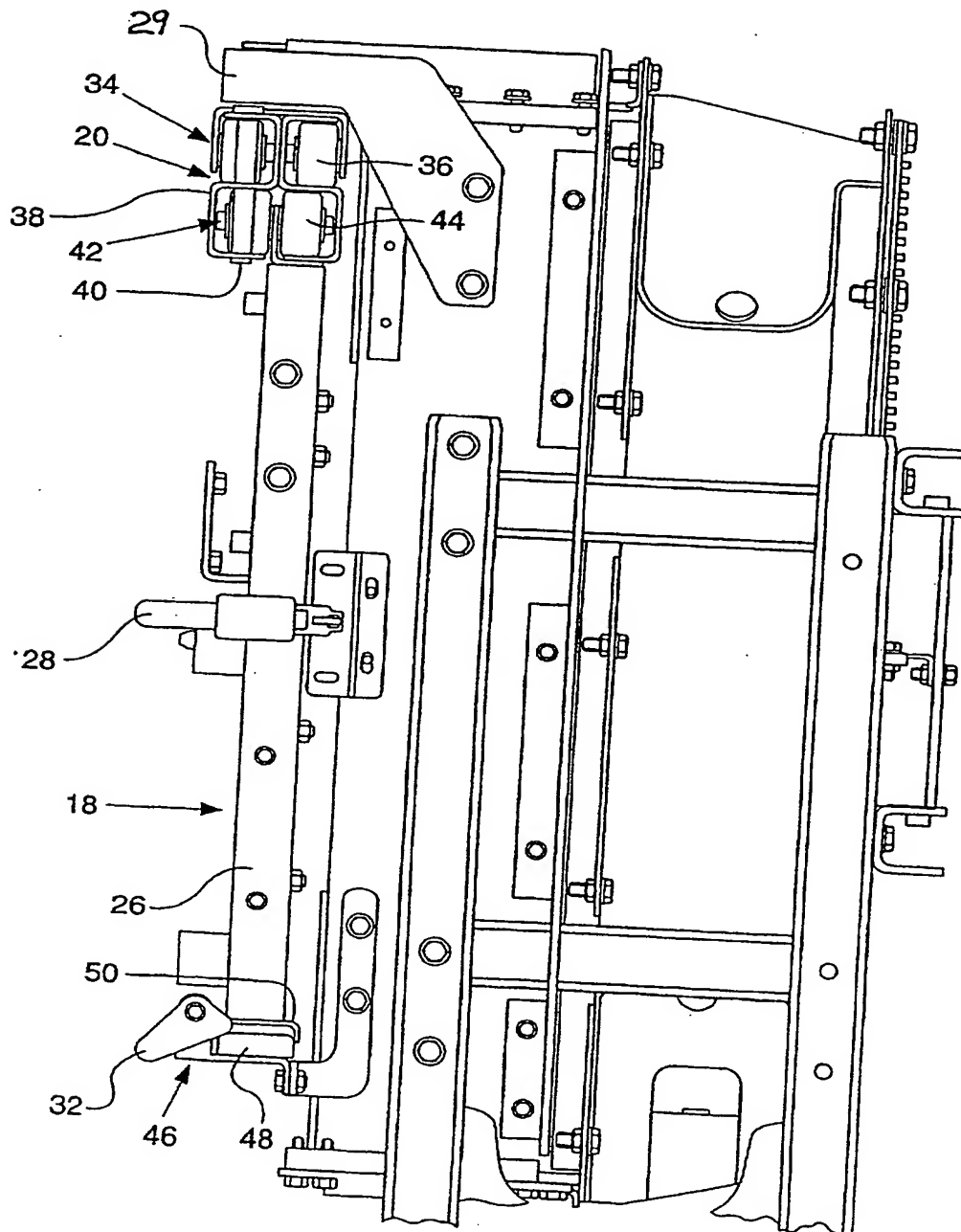


FIG. 3.

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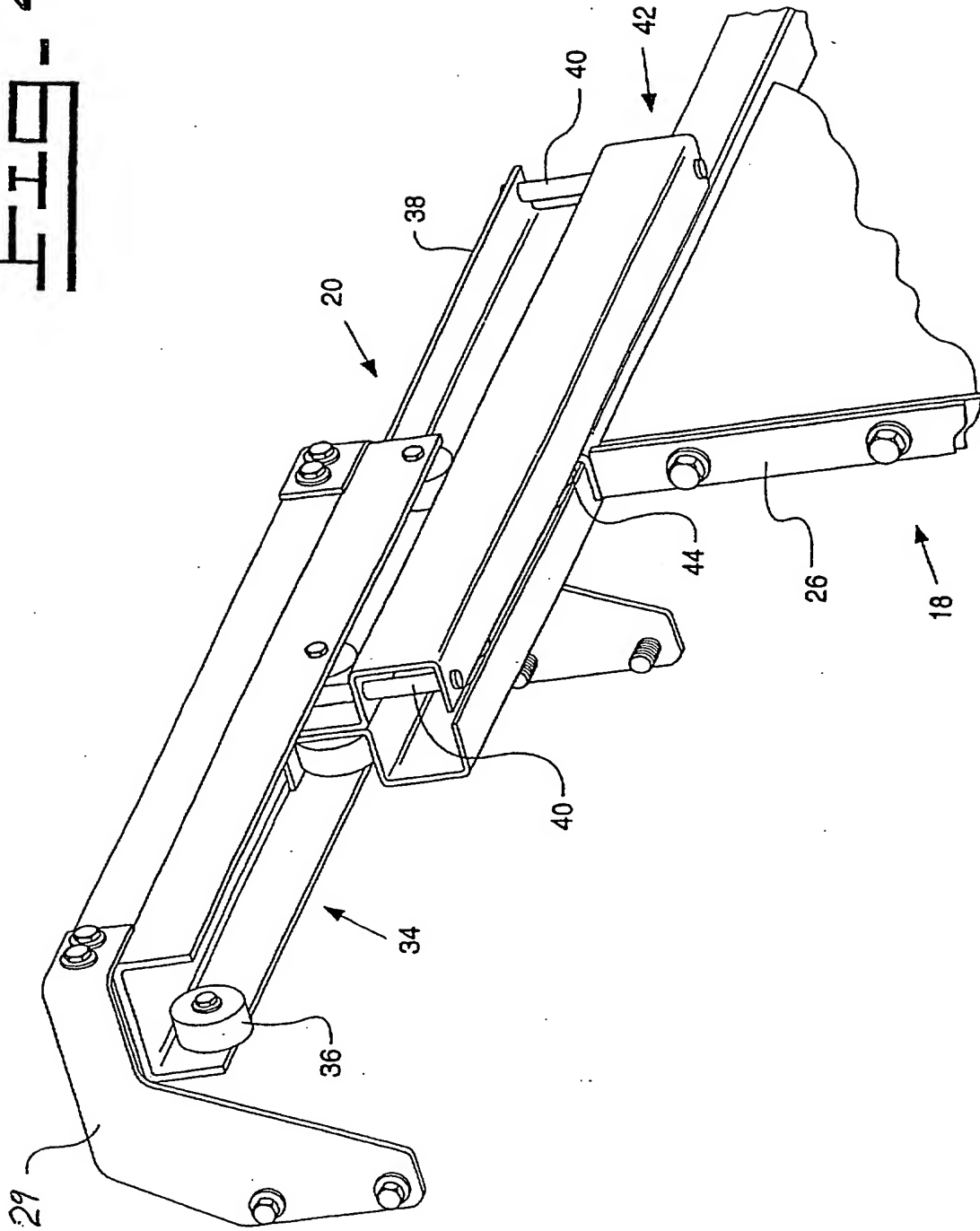
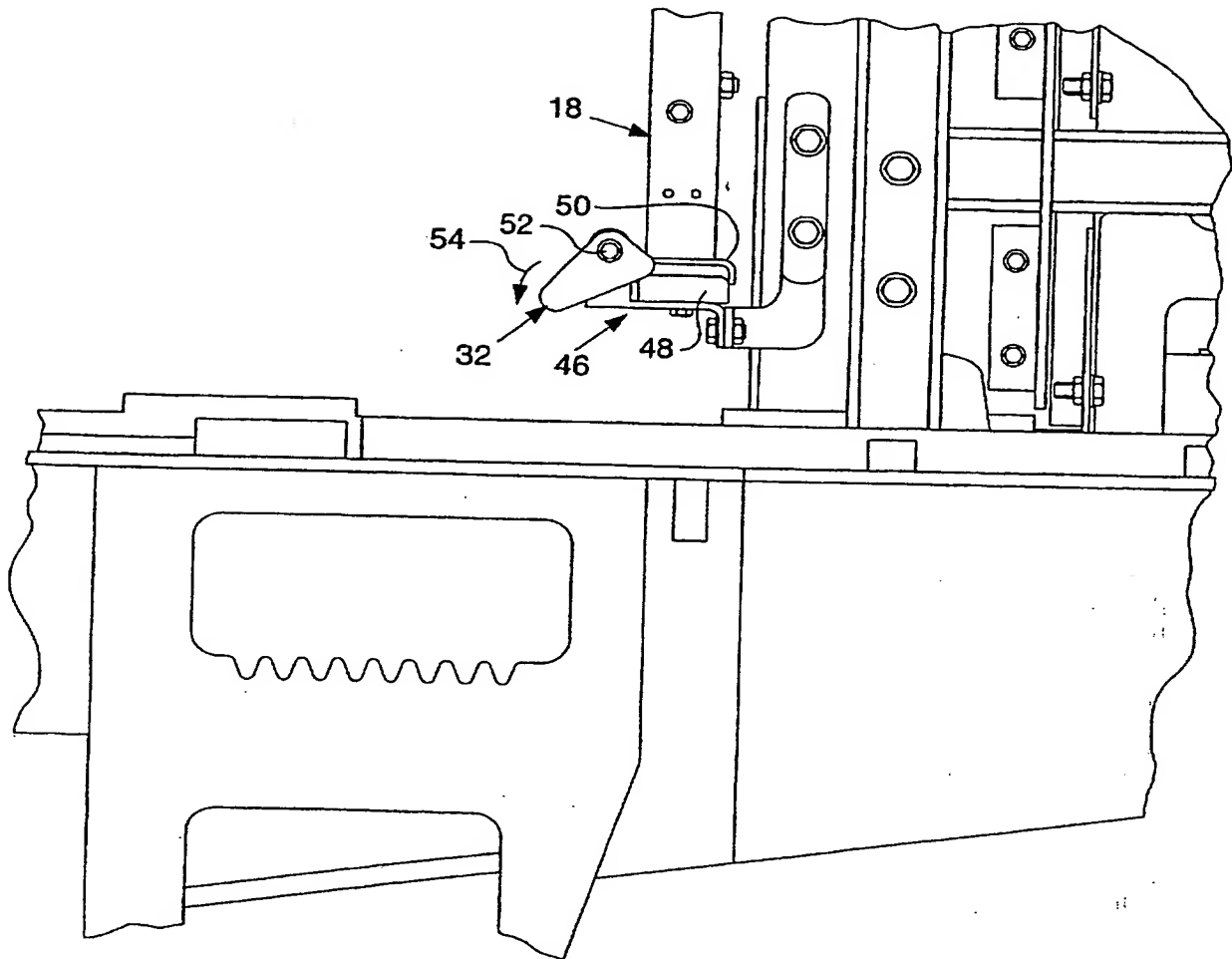
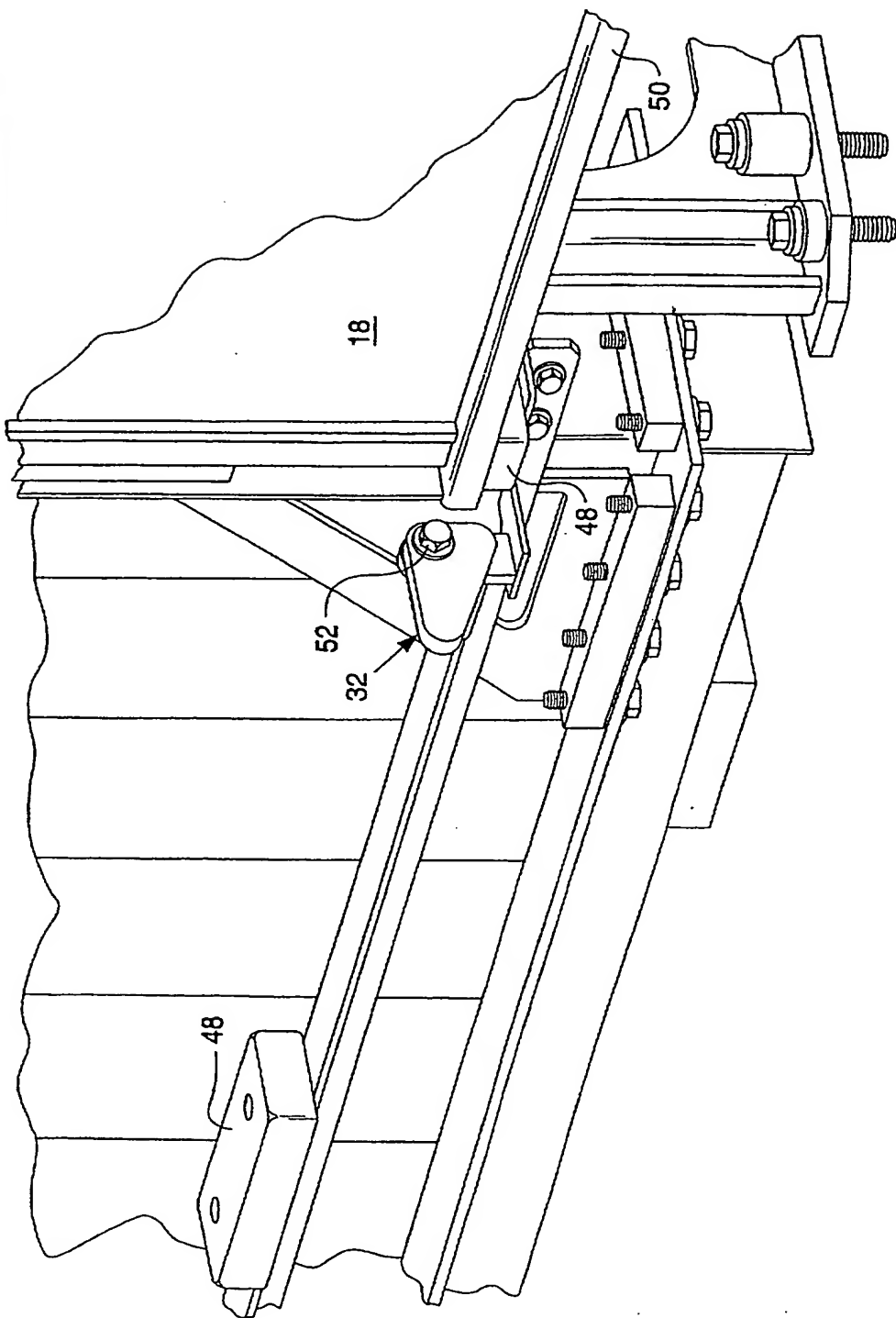


Fig. 5.



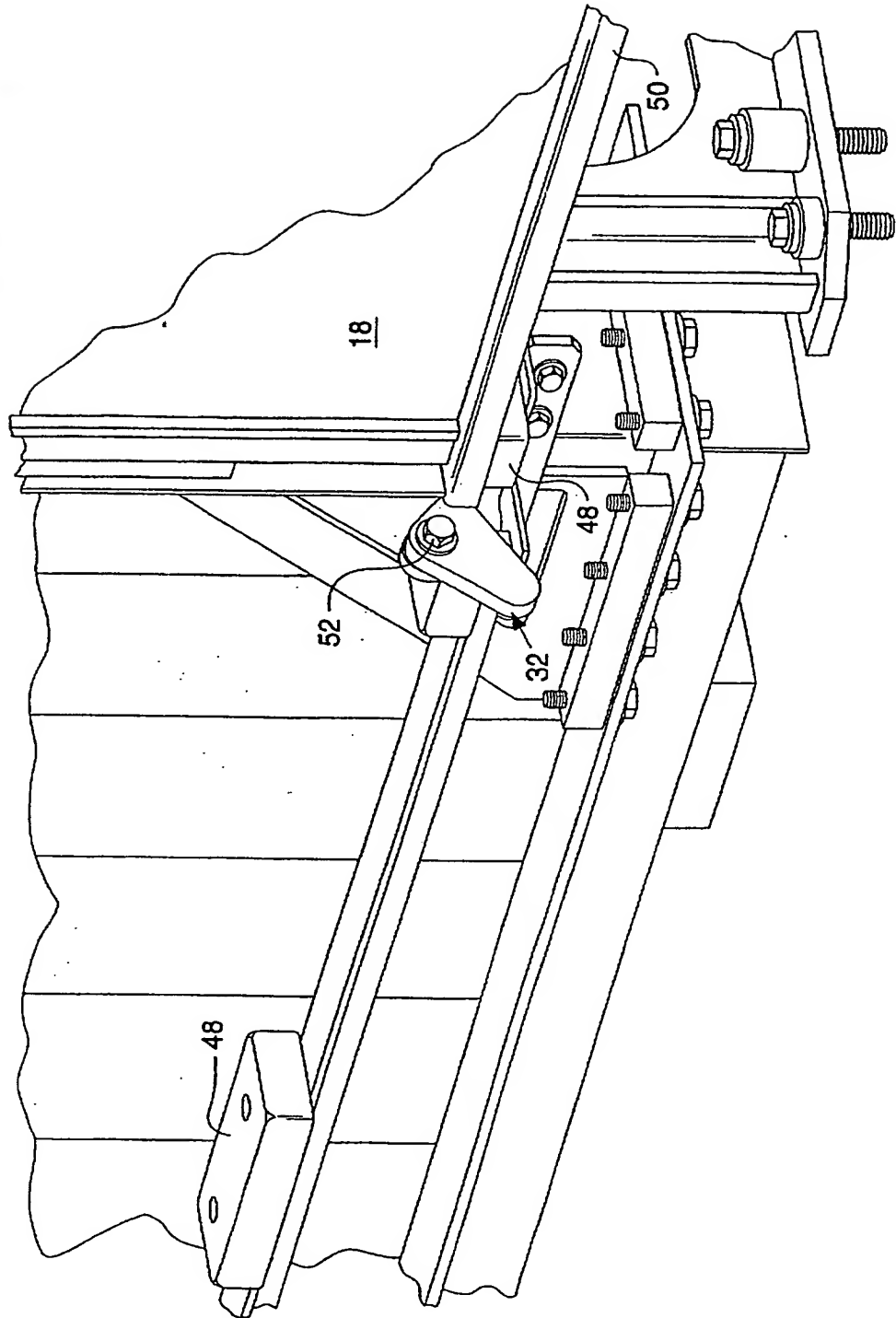
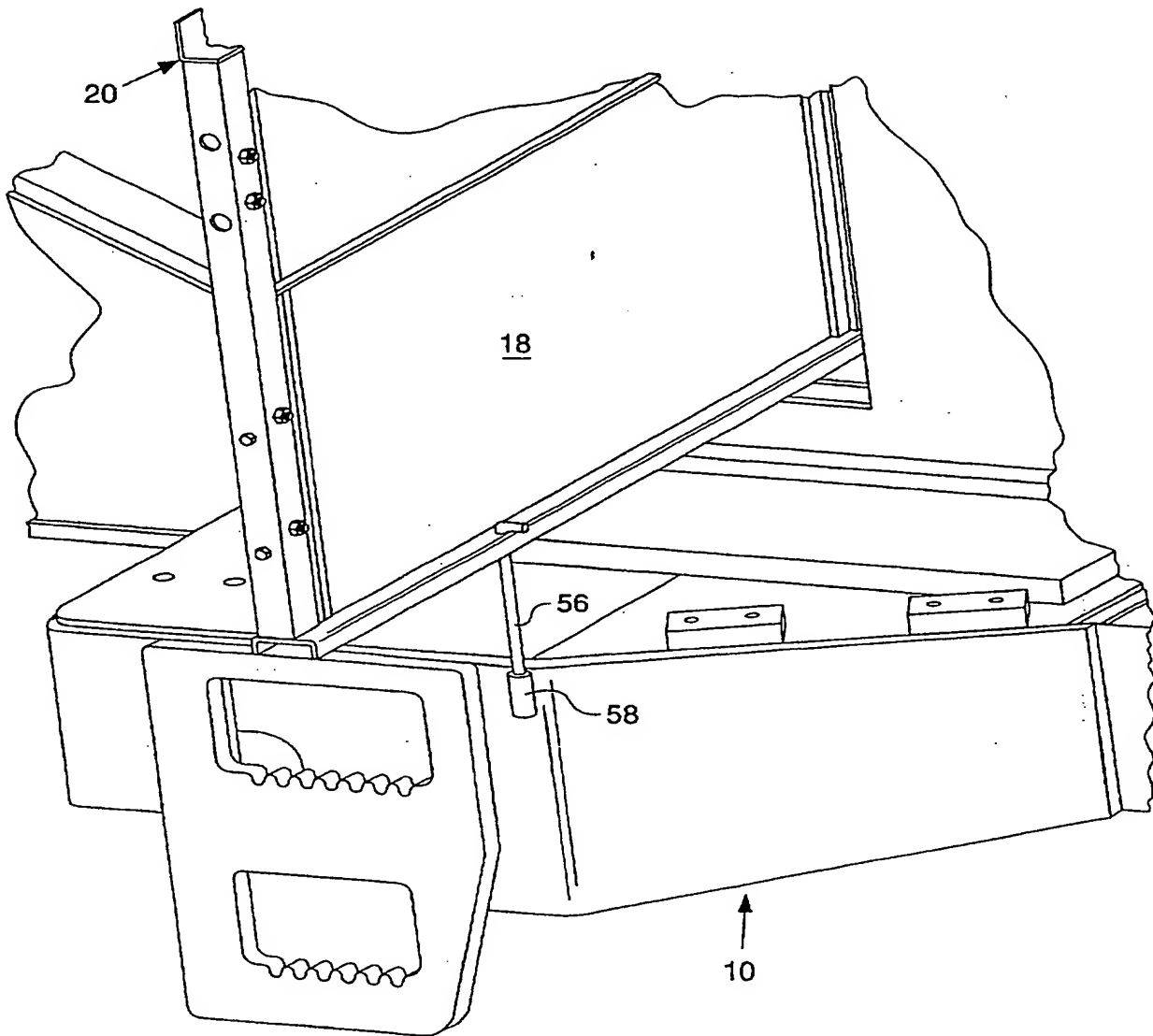


FIG. 8

DescriptionSLIDABLE CORE ELEMENTS FOR A MOBILE MACHINETechnical Field

This invention relates generally to a method and apparatus for mounting core elements and, more particularly, to a method and apparatus for slidably mounting the core elements within a mobile machine for
5 easy access and cleaning.

Background Art

Typically, a mobile machine includes various
10 components having cooling core elements such as a hydraulic oil cooling core element and an air conditioning (A/C) condenser core element. These elements are commonly mounted in a fixed position within an engine compartment of the mobile machine.

The elements are commonly located deep within an engine compartment and exposed to the environment through ducting covers having grating or screens which allow the elements to receive fresh air.

5 During normal operation of the mobile machine in various environments dirt and other debris contaminates the elements. The elements must then be cleaned to maintain efficient operation of their associated components. Cleaning the elements can be
10 a laborious and time intensive operation. Typically, an operator must open one or more covers and reach inside the compartment to gain access to the element. The element may be buried within the compartment and difficult to reach. Further, portions of the element
15 may be located adjacent other components which must be allowed to cool prior to reaching the elements for cleaning. Other portions of the element may be inaccessible without removing an adjacent component. To maintain the elements' effective operation,
20 however, the entire element must be cleaned.

The present invention is directed to overcoming one or more of the problems as set forth above.

25 Disclosure of the Invention

In one aspect of the present invention a core element assembly for a mobile machine includes a core element attached to a slide mechanism. The core element can be slid between a stored position and an
30 extended position.

In another aspect of the present invention a core element assembly for a mobile machine includes a slide mechanism having a first roller assembly and a guide rail. The guide rail is movable along the first roller assembly. A core element is mounted to a frame having a second roller assembly. The second roller assembly is movable along the guide rail between a stored position and an extended position.

In yet another aspect of the present invention a method is provided for mounting a core element assembly to a mobile machine such that the core element is movable between a stored position and an extended position.

15 Brief Description of the Drawings

Figure 1 is a general perspective view of an articulated vehicle for use with the present invention;

Figure 2 illustrates the core element assembly in the stored position with the hood assembly removed;

Figure 3 is an exploded side view of the core element assembly in the stored position;

Figure 4 is a general perspective view of the slide assembly according to the present invention in an extended position;

Figure 5 is an exploded side view of a latch member;

Figure 6 is an exploded perspective view of a latch member in a toggled latch;

Figure 7 is an exploded perspective view of a latch member in an engaged position; and

Figure 8 is a general perspective view of the core element assembly in a supported position by a support rod.

A general perspective view of a mobile machine 10 is illustrated in Figure 1. A hood assembly 12 is generally shown attached to a chassis 14 of the mobile machine 10. The hood assembly 12 typically covers a radiator assembly 16. The hood assembly 12 is removable and protects a core element assembly 18 such as a hydraulic oil cooler, air conditioning condenser, or the like having fluid hoses 19 connected thereto. The core element assembly 18 is slidably mounted to a slide mechanism 20 to provide access to the entire core element assembly 18. Accordingly, access to both sides of the entire core element assembly 18 is readily obtained for cleaning or maintenance by sliding the core element assembly 18 to an extended position.

The core element assembly 18 is illustrated as passing through an opening 22 in the hood assembly 12, however, one skilled in the art will realize that this is for illustrative purposes. The present invention can be incorporated at various access points and is not limited to passing through a hood of an engine compartment area.

The core element assembly 18 preferably includes a core element 24 mounted to a frame 26. The

frame 26 provides a rigid structure to support and protect the core element 24. The frame 26 also provides a mounting point for a clamp 28 such as an over-center clamp to lock the frame 26 in a stored position (Figure 2) such that the core element 24 is rigidly retained during operation of the mobile machine 10.

Figure 2 illustrates the core element assembly 18 in the stored position with the hood assembly 12 removed. The chassis 14 of the mobile machine 10 supports the radiator assembly 16. In the disclosed embodiment the slide mechanism 20 is mounted to the radiator assembly 16 by a mounting bracket 29. A plurality of fasteners 30 retain the mounting bracket 29 to the radiator assembly 16. Although the mounting bracket 29 is illustrated as being attached to the radiator assembly 16, the present invention can be mounted at various locations within the mobile machine 10.

The clamp 28 is preferably provided on both sides of the frame 26 to engage the radiator assembly 16 and assure that the core element 24 is rigidly retained during operation of the mobile machine 10. A latch 32 is also provided which blocks movement of the frame 26. Preferably, the latch 32 automatically pivots to a position that prevents inadvertent actuation of the slide mechanism 20 by interfering with movement of the frame 26 as illustrated in Figure 3.

Figure 3 provides a side view of the core element assembly 18 in the stored position. The slide mechanism 20 includes a first roller assembly 34 attached to the mounting bracket 29. Preferably, a plurality of wheels 36 supports a guide rail 38 which is movable along the first roller assembly 34. A stop member 40 is preferably located within the guide to restrain the maximum travel of the slide mechanism 20.

The core element assembly 18 includes a second roller assembly 42 mounted to the frame 26. The second roller assembly 42 preferably includes a plurality of wheels 44 which are supported along the guide rail 38. The weight of the core element assembly 18 is thereby suspended by the plurality of wheels 36, 44 which travel along the first and second roller assemblies 34 and 42 respectively to allow easy movement of the core element assembly 18 between positions.

To further guide the core element assembly 18, a guide member 46 is mounted adjacent the frame 26. The guide member 46 preferably includes a plurality of guide blocks 48 which fit within a channel 50 mounted to the frame 26. As the core element assembly 18 is preferably suspended from the slide mechanism 10, the guide member 46 does not have to support the core element assembly 18. The guide member 46 preferably just restrains undesirable movement of the core element assembly 18 when in the stored position, however, a wheel or the like can

replace the guide blocks 48 to provide additional support for the core element assembly 18.

Referring to Figure 4, the slide assembly 20 is shown in the extended position. The first roller assembly 34 attached to the mounting bracket 29 allows the guide rail 38 to travel along the plurality of wheels 36. The first roller assembly 34 is extendable until the stop 40 limits further movement. Similarly, the wheels 44 of the second roller assembly 42 travel along the guide rail 38 until a stop 40 is contacted to allow the full extension of the core element assembly 18. Although a plurality of wheels are shown to mount the core element assembly 18, it should be realized that other friction reducing members such as rollers, bearings, or simple mating slides can be provided according to the teachings of the present invention.

Referring now to Figure 5, the latch 32 is mounted adjacent the frame 26 and is preferably mounted to the guide member 46. The latch 32 is pivotally mounted at a pivot 52 which allows the latch to pivot under gravity to a locked position. By mounting the pivot 52 at an offset position, the latch 32 will automatically pivot in the direction of arrow 54. The latch 52 will therefore automatically toggle under gravity to interfere with the movement of channel 50 and retain the core element assembly 18 in the extended or retracted position. As shown in Figure 3, the latch 32 has toggled to a position that

prevents the channel 50 from sliding to the extended position.

Referring now to Figure 6, the latch 32 would preferably be manually toggled to a position
5 that allows the slidable passage of the core element assembly 18. Once the core element assembly 18 has been slid past the latch 32 the latch 32 will toggle under gravity and retain the core element assembly 18 in the extended position (Figure 7).

10 Referring to Figure 8, the core element assembly 18 is again shown in the extended position. To further retain the core element assembly 18 in the extended position a support rod 56 is provided. The support rod 56 is preferably retractably mounted to
15 the core element assembly 18. Once the core element assembly 18 is extended the support rod 56 is extended and fitted into a support receptacle 58 attached to a portion of the mobile machine 10 such as a bumper. Preferably, the support rod 56 supports the extended
20 core element assembly 18 from undue lateral stress. Accordingly, the extended core element assembly 18 can be efficiently cleaned by a power washer or the like without the force from the water jet acting on the slide mechanism 20.

25 The foregoing description is exemplary rather than defined by the limitations within. Many modifications and variations of the present invention are possible in light of the above teachings. The preferred embodiments of this invention have been
30 disclosed, however, one of ordinary skill in the art

would recognize that certain modifications would come within the scope of this invention. It is, therefore, to be understood that within the scope of the appended claims, the invention may be practiced otherwise than
5 as specifically described. For that reason the following claims should be studied to determine the true scope and content of this invention.

Industrial Applicability

10 To clean the core element assembly, an operator preferably disengages a locking clamp and the core element assembly is slidably extended from the mobile machine. A support is extended from the core element assembly and affixed to the mobile machine.
15 The entire core element assembly can then be cleaned. The operator retracts the support and the core element assembly is slidably placed into the stored position. The locking clamp is again engaged.

The present invention may have the advantage
20 of providing a more serviceable core element that provides increased life and more efficient operation of the mobile machine.

Other aspects, objects, and features of the present invention can be obtained from a study of the
25 drawings, the disclosure, and the appended claims.

Claims

1. A core element assembly for a mobile machine comprising:

5 a slide mechanism; and
 a core element attached to said slide mechanism, said core element slidable between a stored position and an extended position.

10 2. The assembly according to claim 1, wherein said slide mechanism includes a first roller assembly and a guide rail, said guide rail movable along said first roller assembly.

15 3. The assembly according to claim 2, wherein said core element includes a second roller assembly, said second roller assembly movable along said guide rail.

20 4. The assembly according to any preceding claim, further comprising a guide member mounted to the mobile machine, said core element guided between said stored position and said extended position by said guide member.

25 5. The assembly according to any preceding claim, further comprising a latch to retain said core element at said stored position and said extended position.

30

6. The assembly according to any preceding claim, further comprising a support attached to said core element to rigidly support said core element at said extended position.

5

7. A core element assembly for a mobile machine comprising:

a slide mechanism having a first roller assembly and a guide rail, said guide rail movable
10 along said first roller assembly; and

a core element mounted to a frame, said frame having a second roller assembly, said second roller assembly movable along said guide rail, said core element slidable between a stored position and an
15 extended position.

8. The assembly according to claim 7, further comprising a guide member mounted to the mobile machine and a channel mounted to said frame,
20 said channel guided by said guide member to guide said core element between said stored position and said extended position.

9. The assembly according to claim 7 or
25 claim 8, further comprising a latch to retain said frame at said stored position and said extended position.

10. The assembly according to any of claims 7, 8 or 9, further comprising an over-center clamp to lock said frame in said stored position.

5 11. The assembly according to any of claims 7 to 10, further comprising a support attached to said frame, said support engageable with the mobile machine to rigidly support said core element at said extended position.

10

12. The assembly according to any of claims 7 to 11, wherein said core element is a hydraulic oil cooler.

15 13. The assembly according to any of claims 7 to 11, wherein said core element is an air conditioning condenser.

20 14. A method of mounting a core element assembly for a mobile machine comprising:

- (1) affixing a slide mechanism to said mobile machine; and
 - (2) mounting a core element to said slide mechanism such that said frame is movable
- 25 between a stored position and an extended position.

30 15. The method according to claim 14, further comprising the step of supporting said core element in said extended position.

16. The method according to claim 14 or claim 15, further comprising the step of locking said core element in said stored position.

5 17. The method according to any of claims 14 to 16, further comprising the step of providing a latch which automatically articulates to a locked position to retain said core element in said stored position.

10 18. A core element assembly for a mobile machine substantially as hereinbefore described with reference to and as shown in the accompanying drawings.

15 19. A method of mounting a core element assembly for a mobile machine substantially as hereinbefore described with reference to and as shown in the accompanying drawings.

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Application No: GB 0025378.1
Claims searched: 1 - 17

Examiner: Tom Sutherland
Date of search: 29 January 2001

Patents Act 1977 Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.S): B7H (HNS)

Int Cl (Ed.7): B60K 11/04, B60H 1/00

Other: Online: WPI, EPODOC, JAPIO

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X	GB 2038471 A (FERODO) See page 2 lines 17 to 60.	1, 14
X	EP 0867319 A (SANDEM) Note column 3 lines 14 to 25.	1, 14
X	US 5819841 (MOYNAT) Column 1 lines 50 to 58.	1, 14
A	US 5178323 (HANSON) See Figs 1 and 2.	

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

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